CLAIMS

What is claimed is:

1. A method for forming a composite laminate structure comprising:

a) providing a first dry fiber preform;

b) placing a thin film adhesive material against a surface of said first dry fiber preform;

c) placing a second dry fiber preform against said adhesive material to thereby sandwich said thin film adhesive material between said dry fiber preforms and thereby form a composite laminate assembly, each of said dry fiber preforms having a plurality of layers of fiber material;

d) placing said composite laminate assembly within an airtight enclosure;

e) heating said thin film adhesive material and said dry fiber preforms to a temperature sufficient to cause said thin film adhesive material to become viscous;

f) causing said viscous adhesive to flow into a subplurality of layers of each of said dry fiber preforms to at least substantially saturate a subplurality of said layers of each of said dry fiber preforms; and

g) after said subplurality of said layers of said dry fiber preforms are substantially saturated with said viscous adhesive, then infusing a resin into each of said dry fiber preforms to thoroughly wet said dry fiber preforms.

2. The method of claim 1, further comprising the step of curing said dry fiber preforms, whereupon said composite laminate assembly is formed into said composite laminate structure.

3. The method of claim 2, wherein said step of curing comprises heating said composite laminate assembly to a temperature between about 200 degrees Fahrenheit and 400 degrees Fahrenheit for a predetermined period of time.

4. The method of claim 1, wherein:

step d) comprises placing said dry fiber preforms within a vacuum bag and;

step f) comprises applying a vacuum to said vacuum bag to cause said viscous adhesive to flow into said subplurality of layers of each of said dry fiber preforms.

5. The method of claim 1, wherein step e) comprises heating said dry fiber preforms to a temperature of between about 150 degrees Fahrenheit and 300 degrees Fahrenheit.

6. The method of claim 5, wherein step g) comprises the step of allowing said dry fiber preforms to cool to a temperature of between about 70 degrees

Fahrenheit and 200 degrees Fahrenheit before beginning to infuse said resin into said preforms.

7. A method for forming a composite laminate structure comprising:

providing a first dry fiber preform;

placing a layer of thin film adhesive against a surface of said first dry fiber preform;

placing a second dry fiber preform against said thin film adhesive layer to thereby sandwich said thin film adhesive layer between said dry fiber preforms and thereby form a composite laminate assembly, each of said dry fiber preforms having a plurality of layers of fiber material;

placing said composite laminate assembly within a vacuum bag;

heating said composite laminate assembly to a predetermined temperature sufficient to cause said thin film adhesive layer to become viscous and to flow into a subplurality of said layers of said fiber material of each of said dry fiber preforms, to thereby at least substantially saturate said subplurality of layers;

after said subplurality of said layers of said fiber material are substantially saturated with said viscous adhesive, then infusing a resin into said dry fiber preforms and using said vacuum to draw said resin through said dry fiber preforms to thoroughly wet said dry fiber preforms; and

curing said composite laminate assembly to form said composite laminate structure.

8. The method of claim 7, wherein said composite laminate assembly is heated to a temperature between about 150 degrees Fahrenheit and 300 degrees Fahrenheit to cause said adhesive thin film layer to become viscous.

9. The method of claim 7, wherein said composite laminate assembly is heated to a temperature of approximately 250 degrees Fahrenheit to cause said adhesive to become viscous.

10. The method of claim 7, wherein said composite laminate assembly is allowed to cool to a temperature below said predetermined temperature that caused said adhesive thin film layer to become viscous after said adhesive has at least substantially saturated said subplurality of layers of said dry fiber preforms, before infusing said resin into said dry fiber preforms.

11. The method of claim 10, wherein said composite laminate assembly is heated to a temperature of between about 150 degrees Fahrenheit and 300 degrees Fahrenheit to cause said adhesive thin film adhesive layer to become viscous; and

wherein said dry fiber preforms are allowed to cool to a temperature of between about 70 degrees Fahrenheit and 200 degrees Fahrenheit after said viscous adhesive saturates said subplurality of layers of said dry fiber preforms.

12. The method of claim 7, wherein said curing step is accomplished by heating said dry fiber preforms to a temperature of between about 200 degrees Fahrenheit and 400 degrees Fahrenheit.

13. The method of claim 7, wherein said curing step is accomplished by heating said dry fiber preforms to a temperature of approximately 350 degrees Fahrenheit for a predetermined length of time.

14. The method of claim 12, wherein said predetermined length of time comprises a duration of between about fours hours and eight hours.

15. A method for forming at least a pair of independent dry fiber preforms into a composite laminate structure, wherein each of said dry fiber preforms includes a plurality of layers of fiber material, the method comprising the steps of:

disposing a thin film adhesive layer between opposing surfaces of said dry fiber preforms such that said adhesive layer is sandwiched between said dry fiber preforms;

placing said dry fiber preforms with said adhesive layer therebetween within a vacuum enclosure;

heating said dry fiber preforms and said adhesive layer to a first temperature sufficient to cause said adhesive layer to become viscous;

applying a vacuum to said vacuum enclosure to cause said viscous adhesive to flow into a subplurality of said plurality of layers of said fiber material of each of said dry fiber preforms to substantially saturate said subplurality of said plurality of layers;

waiting a period of time for said dry fiber preforms to cool down to a second temperature;

once said dry fiber preforms reach said second temperature, using said vacuum to draw resin from a resin reservoir in communication with said vacuum enclosure through said dry fiber preforms to thoroughly wet said dry fiber preforms; and

after said dry fiber preforms have been thoroughly wetted by said resin, further heating said dry fiber preforms to a third temperature greater than said

first temperature to cure said preforms, whereupon curing said dry fiber preforms are bonded to one another to form said composite laminate assembly.

16. The method of claim 15, wherein said first temperature comprises a temperature within the range of about 150 degrees Fahrenheit to 300 degrees Fahrenheit.

17. The method of claim 15, wherein said second temperature comprises a temperature within the range of about 70 degrees Fahrenheit to 200 degrees Fahrenheit.

18. The method of claim 15, wherein said third temperature comprises a temperature within the range of about 200 degrees Fahrenheit to 400 degrees Fahrenheit.

19. A joint comprising:

a first fiber preform having a plurality of plys;

a second fiber preform having a plurality of plys;

an adhesive layer placed between opposing surfaces of the first and second fiber preforms prior to the preforms being infused with a resin; and

wherein said joint is formed by:

first heating said adhesive and said preforms prior to infusing resin in said preforms such that said adhesive migrates into a plurality of plys of each of said preforms;

allowing said preforms and said adhesive to cool for a predetermined period of time; and

infusing resin into each of said preforms to substantially saturate said preforms with resin, said resin substantially backfilling interstices and voids in areas of said plys of said preforms where said adhesive has not saturated.